Metal Finishers Fact Sheet

Utah Department of Environmental Quality

Promoting a Healthy Environment

More than 31,000 metal finishing facilities in the United States generate hazardous waste from their production processes. Pollution prevention - known as P2 - and reducing hazardous waste generation can save money and reduce future liability. Typical wastes include:

- Industrial wastewater and treatment residue
- Spent plating baths
- Spent process baths
- Spent cleaners
- Waste solvents and oils

Waste Reduction

Pollution prevention and waste minimization practices reduce amount of waste generated and subject to regulation. They also help businesses comply with requirements while saving money. Management commitment to P2 and waste minimization is just a beginning. Passing the commitment on to employees through P2 training, waste minimization, hazardous waste handling, emergency response and incentive programs for new waste reduction ideas, is critical for success.

Source Reduction

Waste assessments are used to list the source, type and amount of hazardous waste generated, making it easier to pinpoint where waste can be reduced. Source reduction is usually the least expensive approach. Many P2 techniques involve housekeeping changes or minor in-plant process modifications.

Improved Procedures and Segregated Wastes

- Keep work area clean.
- Improve inventory procedures to reduce the amount off-specification materials generated.
- Designate protected raw material and hazardous waste storage areas with spill containment. Keep the areas clean and organized and make one person responsible for maintaining them.
- Label containers as required and cover them to prevent contact with rainfall and to avoid spills.
- Use a “first in, first-out” policy for raw materials to keep them from becoming outdated. Make one person responsible for maintaining and distributing raw material.
- Designate one person to accept chemical samples and return unused samples to suppliers.
- Limit bath mixing to trained personnel.
- Segregate waste streams for recycling and treatment and to prevent non-hazardous materials from being contaminated.
- Prevent and contain spills and leaks by installing drip trays and splash guards around processing equipment.
- Conduct periodic inspections of tanks, tank liners and other equipment to avoid failures. Repair malfunctions when discovered. Use inspection logs to follow up on repairs.
- Inspect plating racks for loose insulation that causes increased drag-out.
- Use dry cleanup where possible to reduce the wastewater volume.

Material Substitution

- Use process chemicals which are recyclable or treatable on-site.
- Use deionized water instead of tap water in process baths and/or rinsing operations to reduce sludge

volume.
- Use non-chelated process to reduce sludge volume.
- Use non-cyanide process baths to simplify treatment required.
- Use alkaline cleaners instead of solvents for degreasing operations. They can be treated on-site and usually discharged to the sewer with permit authorization.

Extending Process Bath Life

- Treatment can extend process bath life.
- Bath replenishment also helps.
- Monitoring with pH or conductivity meters shows if bath replenishment is needed.

Drag-Out Reduction

- Minimize bath concentrations to the lower end of their operating range.
- Maximize bath operating temperatures to lower solution viscosity.
- Use wetting agents to lessen drag-out.
- Withdraw work pieces from tanks slowly to allow maximum drainage back into process tank.
- Use air knives or spray rinses above process tanks to rinse excess solution off items and into process bath.
- Install drainage boards between process tanks and rinse tanks to route drag-out back to process tank.
- Use dedicated tanks after process baths to capture drag-out.
- Install rails above process tanks to drain work piece racks prior to rinsing.

Rinse Systems

- Use spray rinses as initial rinse after process tank and before dip tank.
- Use air agitation or work piece agitation to improve rinse efficiency.
- Install multiple rinse tanks after process baths to improve rinse efficiency and reduce water consumption.

Recycling and Resource Recovery

- Reuse acid-rinse wastewater as the in-take for the alkaline rinse tank. It allows the fresh water feed to the alkaline rinse tank to be turned off. This can also be applied to process tank rinses.
- Treat rinse waste water to recover process bath chemicals. This allows the reuse of the waste water for rinsing or neutralization prior to discharge.
- Reuse spent by-products from the process baths in the waste water treatment process.
- Recycle spent solvents on-site or off-site.
- Use treatment technologies to recycle rinse waters in a closed or open loop system.
- Some recycling and most treatment processes require a permit.
- Be sure to contact the Division of Solid and Hazardous Waste to determine if you need a permit to treat or recycle your waste.

Treatment Alternatives

- Pre-treat process water to reduce natural contaminants that contribute to sludge volume.
- Use treatment chemicals that reduce sludge generation, such as caustic soda instead of lime.
- Use sludge de-watering equipment to reduce sludge volume.
- Use treatment technologies - such as ion exchange, evaporation or electrolytic metal recovery - that do not use standard precipitation/clarification methods, which generate heavy metal sludge.

For More Information, Contact:

Division of Solid & Hazardous Waste - (801) 538-6170
Division of Water Quality - (801) 538-6146
Environmental Hotline - 1 (800) 458-0145

Pollution Prevention Coordinator - (801) 536-4477